

REMARKS

In response to Office Action mailed February 20, 1997, the applicant respectfully requests reconsideration. To further the prosecution of this application, amendments have been made in the claims and the claims as presented are believed to be in allowable condition. Claims 1-13, 15, 17-23, 25 and 26 are pending in this application. Claims 7, 15, 17, 18, 23, 25 and 26 have been amended herein and claims 14, 16 and 24 have been canceled.

The drawings were objected to because Fig. 1 was not labeled as "Prior Art." Fig. 1 has been amended accordingly.

The drawings were objected to under 37 C.F.R. §1.83(a). The Office Action states that the specific diode connections of claim 11 and the first transistor comprising N-channel MOS transistor and a second transistor comprising a P-channel MOS transistor of claim 14 must be shown or the features canceled from the claims.

The applicant respectfully asserts that the diode connections recited in claim 11, specifically, that the anode of the diode is coupled to the third terminal of the second transistor, and that the cathode of the diode is coupled to the second voltage supply, are shown in Fig. 3.

Claim 14 has been canceled without prejudice to the subject matter contained therein.

Claims 18-22 were rejected under 35 U.S.C. §112, second paragraph. The Office Action states that there is a lack of antecedent basis for "said first and second voltages" in lines 12 and 13 of claim 18. Claim 18 has been amended accordingly. Therefore the rejection of claims 18-22 under 35 U.S.C. §112, second paragraph should be withdrawn.

Claims 7, 12 and 26 were rejected under 35 U.S.C. §102(b) as being anticipated by Pianka (5,345,357). The Office Action states that Pianka discloses a circuit comprising a transistor (201) coupled to a first power supply voltage (V_{DD}) and a second supply voltage (V_{SS}), a second transistor (204) coupled to a third terminal of the first transistor and a second transistor coupled to the second supply voltage (via 202) and a capacitor (205) coupled between a third terminal of the second transistor and the first supply voltage (via 208, 209).

Claim 7 has been amended to recite a first transistor having a first terminal coupled to a first supply voltage and a second terminal connected to a second supply voltage, a second transistor having a first terminal connected to a third terminal of the first transistor and a second terminal connected to the second supply voltage and a capacitor connected between a third terminal of the second transistor and the first supply voltage.

Pianka does not teach every element of the device recited in claim 7, as is required under 35 U.S.C. § 102 (b). Pianka does not teach a first transistor having a first terminal coupled to a first supply voltage and a second terminal connected to a second supply voltage, a second transistor having a first terminal connected to a third terminal of the first transistor and a second terminal connected to the second supply voltage and a capacitor connected between a third terminal of the second transistor and the first supply voltage. Therefore, claim 7 is allowable over Pianka and the rejection of claim 7 under 35 U.S.C. §102(b) should be withdrawn.

Furthermore, the applicant asserts that it would not be obvious to modify Pianka to make the circuit recited in amended claim 7 obvious. Pianka discloses a circuit comprising a

pull-up transistor 201 and a pull down transistor 202. An electrostatic discharge protection device includes transistors 203, 204 and 208, resistor 206 and capacitor 205. If transistor 201 is considered the first transistor recited in claim 1, as is suggested in the Office Action, in order for transistor 201 to have a first terminal coupled to a first supply voltage (V_{DD}) and a second terminal connected to a second supply voltage (V_{SS}), pull-down transistor 202 would have to be eliminated from the circuit. This is not disclosed or suggested by Pianka. In addition, modifying the connection of capacitor 205 of Pianka to obviate claim 7 would completely alter the operation of Pianka. Specifically, changing the connection of capacitor 205 from where Pianka teaches the connection to the connection recited in claim 7, namely between the third terminal of the second transistor (arguably transistor 203 or 204) and the first supply voltage (V_{DD}), would not allow the circuit of Pianka to operate as disclosed. Therefore, such a modification is also not disclosed or suggested by Pianka.

Claim 12 depends from claim 7 and is allowable for at least the same reasons.

The rejection of claim 26 under 35 U.S.C. §102(b) as being anticipated by Pianka is respectively traversed.

Pianka teaches a circuit which protects output buffers from electrostatic discharge. When an electrostatic discharge occurs on bond pad 200, the circuit operates to direct the electrostatic discharge current to a power supply conductor, thereby shorting bond pad 202 either V_{DD} or V_{SS} .

Claim 26 recites a method of protecting a circuit from voltage surges, the method comprising the steps of supplying a voltage from a first power supply to a first switch means,

wherein, upon the occurrence of a voltage surge on the first power supply, the first switch means supplies power from a second power supply to a second switch means, and the second switch means short-circuits the first and second power supplies in order to alleviate the voltage surge.

The circuit of Pianka does not operate to protect the circuit from voltage surges in the power supplies, but rather protects the output transistors from electrostatic discharge on the bond pad. The circuit of Pianka cannot be manipulated to anticipate the method of recited in claim 26. If transistor 201 is considered to be the first switch means, as is suggested in the Office Action, upon the occurrence of a voltage surge on the first power supply, the first switch means cannot supply power from a second power supply to a second switch means, which has been suggested may be transistor 204 of Pianka. Furthermore, upon the occurrence of a voltage surge, the first and second power supplies of Pianka are not short-circuited as is recited in claim 26. Therefore, claim 26 is allowable over Pianka and the rejection of claim 26 under 35 U.S.C. §102(b) should be withdrawn.

Claims 15 and 23 were rejected under 35 U.S.C. §102(b) as being anticipated by Banura (5,023,542). The Office Action states that Banura discloses a device for protecting a circuit from surges having a first transistor (T_3) a second transistor (T_2), a third transistor (T_1), a first power supply (+27V) and a second power supply (GND).

Claim 15 has been amended to recite a device for protecting a circuit against voltage surges comprising a first transistor having a first terminal coupled to first power supply and a second terminal connected to a second power supply, a second transistor having a first

terminal coupled to the first power supply and a second terminal coupled to the second power supply and to a third terminal of the first transistor and a third transistor having a first terminal coupled to the first power supply, a second terminal coupled to the second power supply and to a third terminal of the second transistor, and a third terminal connected to the first power supplies through a capacitor. The third terminals of the first, second and third transistors are coupled to the second power supplies through first, second and third resistors, respectively.

Banura does not disclose every element of the device recited in claim 15, as is required under 35 U.S.C. § 102. Banura does not disclose a device for protecting a circuit against voltage surges comprising a first transistor having first terminal coupled to a first power supply and a second terminal connected to a second power supply, a second transistor having a first terminal coupled to the first power supply and a second terminal coupled to the second power supply and to a third terminal of the first transistor and a third transistor having a first terminal coupled to the first power supply, a second terminal coupled to the second power supply and to a third terminal of the second transistor, and third terminal connected to the first supply through a capacitor, wherein the third terminals of the first, second and third transistors are coupled to the second power supply through first, second and third resistors, respectively. Since a single reference must disclose every element of a claim in order for a 35 U.S.C. §102(b) rejection to be proper, and Banura does not teach every element recited in claim 15, the rejection of claim 15 under 35 U.S.C. §102(b) is improper and should be withdrawn.

Claim 23 has been amended to recite a device for protecting a circuit against voltage surges comprising a first means for switching having a first terminal coupled to a first power

supply and a second terminal connected to a second power supply, a second means for switching having a first terminal connected to the first power supply and a second terminal coupled to the second power supply and connected to a third terminal of the first means for switching, and a third means for switching having a first terminal connected to the first power supply, a second terminal coupled to the second power supply and connected to a third terminal of the second means for switching, and a third terminal connected to the first power supply through a capacitor, wherein the third terminals of the first, second and third means for switching are connected to the second power supply through first, second and third resistors, respectively.

Banura does not teach every element of the device recited in claim 23, as is required under 35 U.S.C. § 102. Banura does not teach a device for protecting a circuit against voltage surges comprising a first means for switching having a first terminal coupled to a first power supply and a second terminal connected to a second power supply, a second means for switching having a first terminal connected to the first power supply and a second terminal coupled to the second power supply and connected to a third terminal of the first means for switching and a third means for switching having a first terminal connected to the first power supply, a second terminal coupled to the second power supply and connected to a third terminal of the second means for switching and a third terminal connected to first power supply through a capacitor, wherein the third terminals of the first, second and third means for switching are connected to the second power supplies through first, second and third resistors, respectively. Since a single reference must disclose every element of a claim in order for a

rejection under 35 U.S.C. §102(b) to be proper, the rejection of claim 23 under 35 U.S.C. §102(b) is improper and should be withdrawn.

Claims 9, 10 and 18 were rejected under 35 U.S.C. §103(a) as being unpatentable over Pianka. The Office Action states that it would have been obvious as a matter of mere engineering design choice to use the first and second resistors recited in claims 9, 10 and 18 in the device of Pianka. This rejection is respectfully traversed.

Claims 9 and 10 depend from amended independent claim 7. In view of the amendments made to claim 7, and the discussion above regarding claim 7, the applicant respectfully asserts that claims 9 and 10, depending from independent claim 7, are not obvious and are indeed patentable over Pianka.

Therefore, claims 9 and 10, which depend from independent claim 7 are also allowable over Pianka, and rejection of claims 9 and 10 under 35 U.S.C. §103(a) should be withdrawn.

Amended independent claim 18 recites a device for protecting a circuit from voltage surges comprising a first means for switching coupled to a first power supply and connected to a second power supply, a second means for switching connected between the first power supply and the second power supply, a capacitor connected between the first means for switching and the first power supply, a first resistor coupled between the first means for switching and the second power supply and a second resistor coupled between the second means for switching and the first power supply. Upon the occurrence of a voltage surge on the first power supply, the first means for switching closes, thereby supplying a voltage to the

second means for switching, which also closes, thereby causing a short-circuit between the first and the second power supplies.

Specifically, the circuit of Pianka does not operate to protect the circuit from voltage surges in the power supplies, but rather protects the output transistors from electrostatic discharge on the bond pad. The circuit of Pianka cannot not be manipulated to anticipate the device recited in claim 18. If transistor 201 is considered the first means for switching, upon the occurrence of a voltage surge on the first power supply, the first means for switching cannot supply power from a second power supply to a second means for switching 204. Furthermore, upon the occurrence of a voltage surge, the first and second power supplies of Pianka are not short-circuited as is recited in claim 18. Therefore, claim 18 is allowable over Pianka and the rejection of claim 18 under 35 U.S.C. §103(a) should be withdrawn.

Claims 1-6, 8, 11, 13, 14 and 19-22 were rejected under 35 U.S.C. §103(a) as being unpatentable over Pianka in view of Koepp (3,636,385). This rejection is respectfully traversed.

Claim 1 recites a device for protecting a circuit against voltage surges comprising a MOS transistor of a first type connected to first and second supply terminals by its source and its drain, respectively, a MOS transistor of a second type connected between the second supply terminal and the gate of the transistor of the first type by its source and its drain respectively, and a capacitor having a first terminal connected to the first supply terminal and a second terminal connected to the gate of the transistor of the second type.

The applicant respectfully asserts that the combination of Pianka and Koepp does not teach or suggest the device recited in claim 1. Koepp teaches a protection circuit including a p-channel transistor 16 and an n-channel transistor 36. Comparing the connections disclosed by Koepp to those recited in claim 1, results in the following: If the drain and source of Koepp's transistor 16 are connected to first and second supply terminals, as is recited in claim 1, the first supply terminal of Koepp would be ground (28) and the second supply terminal would be V_{DD} (26). The recitation in claim 1 of "a capacitor having a first terminal connected to the first supply terminal and a second terminal connected to the gate of the transistor of the second type" would require the connection of a capacitor between the gate of Koepp's transistor 36 and ground 28. Clearly, Koepp does not teach or suggest such a connection and Pianka does not teach or suggest modifying Koepp with such a connection.

Furthermore, modifying Pianka to include the teachings of Koepp would not obviate the circuit recited in claim 1. Even if transistors 201 and 204 of Pianka were of opposite types, two terminals of transistor 201 would have to be connected between supply terminals V_{DD} and V_{SS}, two terminals of transistor 204 would have to be connected between the gate of transistor 201 and the second supply terminal and capacitor 205 would have to be connected between the gate of transistor 204 and V_{DD}. None of these connections are disclosed or suggested by Pianka, and Koepp does not teach or suggest modifying Pianka with such connections. Such modifications would render the device taught by Pianka inoperable for the function disclosed therein.

Therefore, because any combination of Koepp and Pianka does not teach or suggest the device recited in claim 1, claim 1 is allowable over the combination, and the rejection of claim 1 under 35 U.S.C. §103(a) should be withdrawn.

Claims 2-6, which depend from independent claim 1, are also allowable for at least the same reasons.

Claims 8, 11 and 13 depend from amended independent claim 7. In view of the amendments made to claim 7, and the discussion above regarding the combination of Pianka and Koepp, the applicant respectfully asserts that, because claim 7 is allowable over Pianka, claims 8, 11 and 13 are allowable over the combination of Pianka and Koepp because Koepp adds nothing to the disclosure of Pianka which would make claims 8, 11 and 13 obvious. Therefore, the rejection of claims 8, 11 and 13 under 35 U.S.C. §103(a) should be withdrawn.

Claims 19-22 depend from amended independent claim 18. In view of the amendments made to claim 18, and the discussion above regarding the combination of Pianka and Koepp, the applicant respectfully asserts that, because claim 18 is allowable over Pianka, claims 19-22 are allowable over the combination of Pianka and Koepp because Koepp adds nothing to the disclosure of Pianka which would make claims 19-22 obvious. Therefore, the rejection of claims 19-22 under 35 U.S.C. §103(a) should be withdrawn.

Claims 16, 17, 24 and 25 were rejected under 35 U.S.C. §103(a) as being unpatentable over Banura in view of Merrill (5,239,440).

The subject matter of rejected claim 16 has been incorporated into claim 15, and claim 16 has been canceled. Therefore, the rejection of claim 16 under 35 U.S.C. §103 is moot.

Regarding claim 15, the applicant respectfully asserts that the combination of Banura and Merrill is improper because there is no motivation for such a combination. Banura teaches a power converter unit having a current limiting arrangement which activates shutdown whenever a current threshold limit is exceeded. The current limiting arrangement of Banura includes transistors $T_1 - T_4$, a current sensing resistor R_s , a pair of resistors R_1 and R_2 and a Schottky diode D_1 . See column 5, lines 55-66. As disclosed in column 6, lines 15-51, Banura teaches that resistor R_s senses the current across it and compares it to the current through resistor R_2 . When the current across R_s exceeds the current across R_2 , the circuit to which the device is connected, pulse with modulator 46, is shutdown. Therefore, Banura teaches a circuit which monitors the current of a device to minimize current spikes in the device.

Merrill teaches a device which protects integrated circuits from electrostatic discharge, including a trigger circuit 24 which triggers a clamp of the device in the event of an electrostatic discharge.

Banura specifically teaches the use of resistors R_s , R_1 and R_2 to measure and compare the current flowing through the current limiting circuit. There is no teaching or suggestion in Banura that a capacitor such as is taught by Merrill may be used to replace resistor R_s to act as a trigger in the event of an over-current situation. Banura specifically teaches using several resistors to measure the current so that the current in resistor R_s can be directly compared to the current flowing in resistor R_2 . Replacing resistor R_s with the capacitor taught by Merrill would not allow the circuit of Banura to operate as disclosed. Therefore, the combination of Banura and Merrill is improper.

Even if the combination were proper, it would not obviate the device recited in claim 15. Claim 15 has been amended to recite a device for protecting a circuit against voltage surges comprising a first transistor having a first terminal coupled to first power supply and a second terminal connected to a second power supply, a second transistor having a first terminal coupled to the first power supply and a second terminal coupled to the second power supply and to a third terminal of the first transistor and a third transistor having a first terminal coupled to the first power supply, a second terminal coupled to the second power supply and to a third terminal of the second transistor, and a third terminal connected to the first power supplies through a capacitor. The third terminals of the first, second and third transistors are coupled to the second power supplies through first, second and third resistors, respectively.

If resistor R_s of Banura were replaced by capacitor 36 or 47 of Merrill, the capacitor would be connected between the first terminal of the third transistor (T_1) and diode D_1 . Clearly, this is not the same connection recited in claim 15, specifically that the third terminal of the third transistor is connected to the first power supply through a capacitor.

Therefore, even if the combination were proper, amended independent claim 15 is allowable over the combination.

Claim 17 depends from independent claim 15, and is allowable for at least the same reasons.

The subject matter of rejected claim 24 has been incorporated into claim 23, and claim 24 has been canceled. Therefore, the rejection of claim 24 under 35 U.S.C. §103 is moot.

Regarding claim 23, based on the discussion of claim 15, Applicant respectfully asserts that the combination of Banura and Merrill is improper.

Even if the combination were proper, it would not obviate the device recited in claim 23. Claim 23 has been amended to recite a device for protecting a circuit against voltage surges comprising a first means for switching having a first terminal coupled to a first power supply and a second terminal connected to a second power supply, a second means for switching having a first terminal connected to the first power supply and a second terminal coupled to the second power supply and connected to a third terminal of the first means for switching, and a third means for switching having a first terminal connected to the first power supply, a second terminal coupled to the second power supply and connected to a third terminal of the second means for switching, and a third terminal connected to the first power supply through a capacitor, wherein the third terminals of the first, second and third means for switching are connected to the second power supply through first, second and third resistors, respectively.

If resistor R_s of Banura were replaced by capacitor 36 or 47 of Merrill, the capacitor would be connected between the first terminal of the third transistor (T_1) and diode D_1 . Clearly, this is not the same connection recited in claim 23, specifically that the third terminal of the third transistor is connected to the first power supply through a capacitor.

Therefore, even if the combination were proper, amended independent claim 23 is allowable over the combination.

Amended claim 25 depends from independent claim 23, and is allowable for at least the same reasons.

In view of the foregoing amendments and remarks, this application should now be in condition for allowance. A notice to this effect is respectfully requested. If the Examiner believes, after this amendment, that the application is not in condition for allowance, the Examiner is requested to call the Applicants' attorney at the number listed below.

If this response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicants hereby request any necessary extension of time. If there is a fee occasioned by this response, including an extension fee, that is not covered by an enclosed check, please charge any deficiency to Deposit Account No. 23/2825.

Respectfully submitted,

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